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REPORT ON MISSION UNDERTAKEN TO SELECTED COUNTRIES IN THE SUBREGION WITH A VIEW TO ASSESSING THE SUBREGION ON FORMULATION OF INTEGRATED ENERGY POLICIES AND THEIR INTEGRATION INTO OVERALL DEVELOPMENT POLICIES (CASE OF UGANDA, ZAMBIA AND ZIMBABWE)

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I. Introduction

This paper is based on the findings resulting from the advisory services missions undertaken by ECA energy expert to Uganda, Zambia and Zimbabwe in June 1988.

It was felt for some time in the Natural Resources Division of ECA that the issues of the development of integrated energy policies is of priority in view of the critical role which energy plays in the economic development of African countries. Hence the purpose of this study on institutional strengthening in the energy sector was to examine the relevant institutions and organization of the energy sector in Uganda, Zambia and Zimbabwe, identify their weaknesses and recommend ways to overcome them.

II. Energy situation in the countries under study

(a) Uganda

The main source of energy in Uganda is wood fuel constituting more than 90% of the total energy consumption. This is an unhealthy situation because it has led to deforestation of some parts of the country. People have to search wider areas for firewood, the areas have become infertile and in the North the desert is encroaching on lands which used to be agricultural. All in all, the ecological balance is being disturbed. It is estimated that without intensive measures being instituted, the demand for fuel wood will exceed sustainable supply by 117% in the year 2000. Other sources of energy are petroleum, hydro electricity and charcoal.

The energy consumption in Uganda by source is as follows petroleum 3,52%, electricity - 0,5%, woodfuel - 92,0% and charcoal - 4,0%.

Uganda imports all her oil product requirement. The oil bill is a crippling factor for the economy. In the early 1980's about 60% of the annual total export earnings was spent on oil products. With the creation of the Ministry of Energy, emphasis has been put on implementation of measures to reduce the import bill. These measures include regulating the oil imports by oil companies through the use of letters of credit to the suppliers, and by making sure that what is imported into the country is not smuggled out. The monthly import bill is now $6,7 million.

The country is endowed with hydroelectric potential which is concentrated along River Nile. It is estimated that the studied sites on the River could have some 2,000 MW installed capacity. Presently the country depends on one hydropower plant, the Owen fall on River Nile with 150 MW capacity. There are plans to construct another hydropower plant but environmental issues have delayed the decision to go ahead. Apart from the studied hydropower potential of River Nile, thereare a number of other small rivers which could be used for both mini and micro plants.

Given the fact that hydropower is the cheapest source of energy, therefore the present policy is to use hydroelectric power as much as possible. The major objectives of the energy sector are as follows:

- Rehabilitate and up-rate Owen falls dam;
- Encourage industries to change from oil to hydropower wherever it is possible;
- Discourage the excessive use of wood;
- Encourage efficient use of all forms of energy including the procurement of petroleum products.

Numerous studies on the development of energy resources and on issues and options in the energy sector of Uganda have been carried out during the past 10 years. The most comprehensive reports have been prepared by the Energy Department of the World Bank in co-operation with Division for Global and Interregional Projects of UNDP. These are the report on issues and options in the energy sector (No. 4453-UG), report on institutional strengthening in the energy sector (No. 029/85) and staff appraisal report (No. 5320 UG). The Energy assessment report identified the issues and made recommendations for the sector policies and development. The main issues identified were (a) the high cost of petroleum imports; (b) relatively low efficiency in the use of petroleum products and wood fuels; (c) distortions in retail prices of petroleum products and shortcomings in the retail pricing formula; (d) unreliability of power supply and high power system losses; (e) shortfall in power generation capacity to meet forecast demand beyond the mid-1980s; (f) low level of power tariffs and inappropriate tariff structure; (g) insufficient supply of fuelwood, especially in Kampala/Entebe region; (h) inadequate level at stumpage fees, and (i) lack of sectorwide coordination and planning.

(b) Zambia

Current energy situation in Zambia in fully reflected in the joint report, prepared in March, 1988 by the team of experts from the Department of Energy Ministry of Power, Transport and Communications of Zambia and the UNDP-World Bank Energy sector management assistance Programme.

Energy situation in Zambia should be viewed in the context of subregional energy situation in SADCC. Two main problems have characterized the energy situation in the SADCC region over the last decade:

(i) cost and availability of petroleum supplies and petroleum imports which consume scarce foreign exchange reserves in most countries;

(ii) the progressive depletion of the region's woodfuel resources means that less energy is available to the large majority of households, which depend almost exclusively on this source. This also leads to environmental degradation resulting in reduced agricultural production.

Zambia's issues and options in the energy sector are outlined in the comprehensive report of the Joint UNDP/World Bank energy sector assessment programme prepared in January 1983. Zambia hosted in the same year the meeting on industrial energy management and new and renewable sources of energy sponsored by UNIDO. The contacts with the Energy Department of the Ministry of Power, Transport and Communication have revealed that in 1988 energy experts are finalizing the study on analysis of the energy sector strategy in Zambia. Firsthand knowledge of this important work being done by the Energy Department, revealed that this study outlined a priority energy sector investment programme for the period 1989-1993. These priorities reflect the current economic situation, the condition of the energy supply systems, and the most pressing concerns of energy policies and technical assistance activities designed to facilitate the achievement of the energy strategy's objectives.

(c) Zimbabwe

Fuelwood, coal and electricity are the main indigenous sources of energy in Zimbabwe. All the petroleum fuels used in the country have to be imported. Fuelwood accounts for about 60% of the total energy consumption, being the major source of energy for cooking in the rural areas of the country and for low income urban households. The high rate of fuelwood consumption has resulted in deforestation and shortage of the fuel in some parts of the country.

Although Zimbabwe has abundant coal reserves (estimated at 11,000 million tons) only one colliery has been developed and this mine produces about 3 million tons of coal annually. Coke is also produced at the same mine and as well as in Zimbabwe iron and steel Corporation coke ovens. Coal is used mainly in industry (steam raising), agriculture, metallurgy and in thermal power generation.

Zimbabwe gets its power from the Kariba hydropower station which it shares with Zambia (600 MW) as well as from coal fired thermal power stations: Hwange (920 MW), Harare (135 MW), Mungati (120 MW) and Bulawayo (120 MW). All the power stations are interconnected. Great potential for hydropower development exist on the Zambezi river.

As part of import substitution and to save on foreign currency, Zimbabwe commissioned an ethanol from sugar plant producing about 40 million litres of ethanol annually. The ethanol is blended with petrol in the ratio 15/85 ethanol/petrol and used as a motor fuel. Plans are underway for a second ethanol plant to bring the blending ratio to 20%. Investigations are also being carried out on the feasibility of blending diesel with butanol. A part of the railway line has been electrified to save on diesel.

Energy development activities and strategy should aim to achieve the following:

- to reduce the growing burden of energy imports and especially petroleum fuels;
- to develop to the maximum indigenous energy resources (coal, hydro, ethanol) at least cost;
- to make more efficient utilization of all energy forms whether imported or local.

To accelerate the development of energy resources the Government set up the Department of Energy in 1980, to coordinate all energy development activities and to formulate policy and strategy.

To facilitate production of a coherent energy development a number of studies were commissioned: (a) The World Bank/UNDP "Issued and Options" identified the major problems in energy development which included uncoordinated activities by various bodies, unfavourable pricing policy and the high burden of imported fuels; (b) the Beijer Study "Zimbabwe Energy Accounting Project" analysed and quantified energy end-use patterns and provided valuable data on fuel wood consumption which was not available before. It also recommended the setting up of a planning unit in the Department of Energy. This was implemented in 1986; (c) The energy Pricing Study by Coopers and Lybrand recommended pricing formulae for the various energy resources (coal, electricity, petroleum and ethanol) for optimal development of the whole economy; (d) the coal Resources and Utilization Study analysed coal resources in the country and recommended some technologies such as coal gasification to maximize use of this resource. Other studies include the Power Development Plan and the Petroleum Fuels supply (storage studies). Currently a study is underway to formulate an integrated energy supply strategy.

Assistance has been received from the West German government to establish a computerised energy data bank which will make the planning exercise easier by making useful information readily available to the planners. The Government is also considering adoption a computerised energy planning model developed by the Beijer Institute to facilitate plan development and demand projections.

To save foreign currency the Government encourages the use of abundant local fuels instead of imported or scarce fuels and also encourages efficient utilization of all resources. (a) Industry is encouraged to use coal, coal tar fuel and electricity instead of diesel or gas for heating. (b) Ethanol production will be increased to enable blending with petrol in the ratio 20/80 ethanol/ petrol fuel for use in car engines. (c) A regional project SADCC Industrial Energy Conservation Project launched in late 1987 encourages efficient utilization of energy by carrying out energy consumption audits on factories. Potential savings of upto 30% have been identified. The project will also hold training sessions for engineers in energy management. (d) In the rural areas efficient wood burning stoves are being disseminated and the use of alternative fuels such as coal, biogas and solar energy is being encouraged to alleviate the pressure on the woodfuel base.

Country's report on issues and options in the energy sector of Zimbabwe of 1982 has indicated that demand for energy will rapidly grow in this country. At the meeting of industrial energy management and new and renewable sources of energy held at Lusaka in 1983 under the auspices of UNIDO the energy needs of SADCC member States were clearly identified. Since then Zimbabwe embarked on the programme of development of NRSE within technical assistance rendered by bilateral donors. For example the Commonwealth Science Council has established the African Energy Programme which accorded the highest priority to seeking solutions to the energy problems of Africa's predominantly rural populations. The national projects in Zimbabwe were executed within the framework of a regional network and they cover two major subjects: namely solar crop drying and biogas for rural development.

III. Organization of energy sector

(a) Uganda

Before February 1986 energy sector was managed by the Ministry of Power, Posts and Telecommunications. The World Bank Study carried out under the Joint UNDP/World Bank Energy Sector Management assistance programme in 1985 recommended the establishment of the new Energy Department in the Ministry of Power, Posts and Telecommunications. This Department has been charged with the responsability for formulating recommendations for, and regulating the implementation of, all aspects of energy policy.

In February 1986 the new Ministry of Energy (MOE) was created and its structure was established by Presidential Decree in October the same year. Although the new Ministry has quickly come to grips with the energy problems facing Uganda it is still constrained in its operations by small staff and a lack of technical skill. The MOE is now facing its crucial task of settling down in order to play an effective role in carrying out the responsibility in policy formulation and implementation of all energy issues vital for the national economic development of the country.

(b) Zambia

Co-ordination between the various Governmental, parastatal and semi-private organizations active in the energy field is relatively weak at present. Consequently there is no coherent strategy guiding decisions and actions in the energy sector and no way systematically addressing the major energy policy issues.

The major energy institution in the country is the Department of Energy in the Ministry of Power, Transport and Communications.

The second key institution in the energy sector is ZIMCO. It has the responsibility for implementing the energy policy decisions of the Government, it is also responsible for initiating investments in other industries that have a direct impact on energy use and the energy balance alongwith the in-house capability to analyse and advise on energy issues.

(c) Zimbabwe

In Zimbabwe since independence energy sector was managed by the Ministry of Mines and the Ministry of Industry and Energy Development. As a result responsibilities for energy were fragmented. The organization of the energy sector in Zimbabwe has recently become more co-ordinated with the establishment and strengthening of the Ministry of Energy and Water Resources whose responsibilities are to implement, co-ordinate and monitor appropriate energy policies. Although the new Ministry (MEWRD) has quickly come to grips with the energy problems facing the country it is constrained in its operations by small staff and a lack of technical skill.

The Ministry strongly feels that there is need for properly organized planning capabilities which may be stregthened through internal reorganization and external assistance. Under the responsibility of the Department of Energy come all the programme undertaken in the country related to both conventional and renewable sources of energy. Exploration programme for hydrocarbons in Zambezi valley which is currently under consideration in Zimbabwe comes under jurisdiction of the Ministry of Mining.

In hydropower sector the MEWRD feels that it is necessary to develop simultaneously large scale and small size projects to serve both the nation as a whole and accomodate some small-scale farmers in the rural areas. Zimbabwe is seeking financial support of bilateral donors for the implementation of these projects. In these projects water development and energy components are complimentary.

Zimbabwe is attaching great importance to assisting the frontline states of SADCC in manpower training. In June 1988 the SADCC meeting on manpower training in the petroleum sector was organised in Harare, which inter-alia discussed the distribution of oil products by multinational companies in each SADCC country.

IV. Recommendations

Developing an effective energy policy requires that decisions and actions affecting the supply and use of all forms of energy should be considered both as a whole and in relation to each other and institutional arrangements must reflect this situation.

(a) Uganda

The discussions held in the Ministry of Energy indicated that the problems in Ugandan economy and in the energy sector are of dual origin. Domestic difficulties arise from an economy when the basic needs basket for the majority of the population is several times greater than their formal wage income. For this reason no Ugandan wage earners, civil servants included have been able to meet more than 10 per cent of their basic needs basket out of their formal wage incomes. As a result of this many government offices and the Ministry of Energy is heavily understaffed, in some departments besides the Directors they have on board one-two people to implement the ambitious programmes get up by the Government. The lack of interest sometimes is expressed in absenteeism hence the job does not provide the necessary incentives for employees. This situation should be improved by the respective actions of the Government.

There is a lack of subregional co-operation in exploration and development of energy resources which also hampers economic development of the East African countries. Uganda for example would have benefited greatly working together with Kenya, Tanzania, Zaire and Sudan because of the complementarity of the available energy resources.

Kenya, for instance, would have benefited from Uganda's electricity instead of having to rely on oil generation of electricity or more costly hydro-thermal power and Uganda would, of course, have earned considerable amount of foreign exchange from the sale of electricity. Owen falls dam with re-inforced capacity would supply power not only to Kenya, but also to North Western Tanzania, Eastern Zaire and Southern Sudan, thereby earning a lot of foreign exchange for Uganda while saving Uganda's neighbours the cost of trying to get electricity from more costly sources.

It would not be fair to say that Uganda is completely devoid of international help and assistance in rehabilitation and the development of its energy sector. The studies and missions executed by the UNDP and World Bank among others have helped the Government to formulate the policy and to align the structure of their institutions according to the recommendations of international and bilateral experts. However these recommendations do not help much in day-to-day running of the energy sector. The Ministry of Energy should also have the necessary subordinate organisations both governmental and parastatal which can serve as operational arms of the Ministry.

In view of the above it was recommended that request of the Ministry of Energy to invite the fact-finding mission to Uganda should be accommodated by UNDP or DTCD as soon as possible.

(b) Zambia

The Zambian energy sector is managed by a mixture of government departments, public enterprises and a small number of semi-private enterprises. The roles of the various governmental bodies are not clearly defined, their roles appear to overlap, and leadership and co-ordination is lacking. As a result, there is no clear energy strategy, with the risk that sub-optimal decisions will be taken and opportunities missed at significant cost to the economy.

Recognizing the importance and roles of the Department of Energy in the Ministry of Power, Transport and Communications and the energy sector of ZIMCO, it is recommended that the Government should establish a high level energy policy coordinating committee to bring leadership and policy guidance to the energy sector of Zambia.

(c) Zimbabwe

Recent studies in Zimbabwe have shown that the most widespread primary cause of deforestation were land clearing for agriculture coupled with indiscriminant trees felling for wood fuel and charcoal production.

In order to implement a smooth energy transition in Zimbabwe it is recommended to overcome the obstacles related to equipment design and technology cost problems and the relative weakness of policies and institutions concerned with the development of renewable energy. There is an understanding in the Department of Energy however that renewable energy technologies are best exploited on a small scale and decentralized basis and are ideally suited to the needs of a dispersed rural population. It is clear that much of the equipment needed for renewable energy technologies seems to be suitable for production in even the less industrially advanced country than Zimbabwe.

V. Conclusion

The main problem in the energy sector of Uganda, Zambia and Zimbabwe is its currently fragmented institutional structure at all levels which prevents the member States to formulate the integrated energy policies. There is an urgent need to strengthen existing national capabilities in the overall energy planning in order to ensure that the coordination of various energy subsectors (petroleum, coal, power, household energy, NRSE) take into consideration both short and long term supply options on a fully integrated basis.

There is lack of co-ordination in the energy policies at the subregional level despite the existance within PTA and SADCC of the subregional institutions responsible for research and development, training and management in the energy sector. These subregional economic groupings in co-ordination with ECA MULPOC in the subregion should make suggestions and recommendations on the best ways of improving the national capability for policy decision-making as well as increased utilization of national capacity in implementing programmes and projects.

The Governments of the member States whose energy policies are discussed in this paper should realize that the success or failure of their energy institutions which they established for the development of coherent energy policies lies in their own hands.